

gallons in 1941, and 570,000,000 gallons in 1960. Of the various sources of supply, that from the Thames alone is capable of considerable expansion, and in 1960 it is estimated that 450,000,000 gallons per day may be taken from that river. In order to admit of this expansion, immense storage reservoirs would require to be constructed; the amount of storage necessary in 1916 would be 6,436,000,000 gallons, in 1941 as much as 27,276,000,000 gallons, and in 1960 the prodigious amount of 54,059,000,000 gallons, the necessary storage increasing at a greater rate than the supply. The chief engineer believes that 450,000,000 gallons is the limit which could be taken economically from the Thames in any conditions.

The works at present in existence or authorised will suffice for the supply of London until 1917, and to provide the additional works required at that date it will be necessary to approach Parliament for new powers in 1910. The new scheme which has been definitely adopted as the policy of the board is to develop the supply from the Thames valley, and to trust to that as sufficient for the next fifty years, but at the same time to acquire powers for securing a supplemental source of supply to be utilised when the existing sources can no longer be developed economically. In the report as issued reference is merely made to "a distant source" being necessary fifty years hence, but in the debate the source was referred to plainly as Wales. It is remembered that before the creation of the Metropolitan Water Board the London County Council as water authority developed a scheme for supplying London with water from Wales in competition with the companies, and it was proposed in the debate on the report before the Water Board to proceed forthwith with a Welsh scheme, but a very large majority agreed to endorse the recommendations of the report in this particular. The three important resolutions as amended in another particular and adopted are as follows:—

"(a) That in the opinion of the Board it is desirable to seek Parliamentary powers enabling them to provide additional supplies from the Thames for as long a period as is economically practicable.

"(b) That as the increase in population will eventually render resort to some other source than the Thames watershed imperative, the Board view with great alarm the increasing tendency of authorities throughout the kingdom to appropriate water-supplying areas for their particular use, and in these circumstances desire to urge upon Parliament the necessity for regulating the appropriation of water-supplying areas, so that the needs of the metropolis as well as of other populous places may receive due consideration.

"That a copy of the foregoing resolution be sent to the President of the Local Government Board, and that he be asked to receive a deputation from the Board on the subject; and further, that in the event of such request being granted, the Works and Stores Committee be authorised to make all necessary arrangements with regard to the deputation.

"(c) That it be an instruction to the Works and Stores Committee to prepare and submit to the Board as early as practicable a scheme to give effect to the foregoing resolutions."

The Metropolitan Water Board is the largest and most important water authority in the United Kingdom, being responsible for the supply to one-sixth of the population of the British Isles. The distribution of rainfall, on which water supply depends immediately or ultimately, is, speaking broadly, the inverse of the distribution of population. Taking the part of England and Wales south of the Trent, it may be said that most people live in the Thames valley, while most rain falls in Wales. Much rain falls also on Dartmoor, Exmoor, and in the Lake District,

all of them distant and unpeopled places on which the eyes of nearer populations have been turned for some time. It is the custom of Governments to assume control of the distribution of natural treasure and to regulate the pegging-out of claims for hewing out gold or diamonds, and the Water Board now proposes to ask for the extension of this principle to the drawing of water for great communities. The suggestion is not new, but it will none the less meet with keen opposition, for the large towns with great and distant water supplies are usually permitted and sometimes compelled by Parliament to sell surplus water to the communities along the track of their aqueducts, and hence municipal foresight may involve taking thought also for possible interference with spheres of interest.

It is interesting to compare the proposed appeal to Government to keep a place in the struggle for water-yielding grounds for the supply of London half a century hence with the arguments employed by Mr. Urquhart A. Forbes in a paper on "The Water Supply of the United Kingdom" in the October number of the *Quarterly Review*. Mr. Forbes urges the appointment of a central water board for the country with subordinate watershed boards in order to check the depredations of the great towns on the upper reaches of rivers, and to ensure the maintenance of the lower streams in a condition fit for navigation and fishing. It must not be forgotten that rivers not only water the land, but drain it as well, and to the mind detached from all municipal or commercial schemes it appears self-evident that the same channel should not be required to act both as an aqueduct and as a sewer. On the other hand, it is an acknowledged fact that the insertion of a properly proportioned artificial lake in the upper waters of a river benefits that river by checking floods in wet weather and maintaining a good flow in dry weather, while it enables a permanent and pure supply to be drawn for the uses of a distant population. To the scientific mind the surprising thing is that steps have not been taken long ago to gauge the flow of all the rivers in the country and to establish rain gauges in remote and uninhabited places where the treasure of the heavens descends in fullest amount. Not until this has been done can the alliterative dictum of Mr. John Burns—"Rain to the rivers, sewage to the sea"—become an effective mandate.

NOTES.

THE Nobel prizes, of the value of nearly 7700*l.* each, were presented at the Academy of Sciences at Stockholm on Tuesday. In science, the prizes were awarded as follows:—physics, Prof. Michelson, University of Chicago; chemistry, Prof. Buchner, University of Berlin; medicine, Dr. Laveran, Pasteur Institute, Paris.

THE Glasgow Corporation has decided to confer the freedom of the city on Lord Lister.

A TELEGRAM from Largs states that Lord Kelvin has not been well for more than a fortnight, and has been confined to his bed. His condition on Tuesday night had improved.

MR. J. D. ROCKEFELLER has just given an additional sum of more than 520,000*l.* to the Rockefeller Institute for Medical Research in New York, to be held as an endowment the income of which is to be used at the discretion of the management.

THE death is reported, in his seventy-ninth year, of Dr. Asaph Hall, professor of astronomy at Harvard since 1895. Prof. Hall received an elementary-school education in his

boyhood, and worked for some time at farming and carpentry. In 1857 he became an assistant at Harvard Observatory, which he left in 1862 to enter the service of the Naval Observatory of the United States.

AN International Congress of Low Temperature Industries will be held at Paris for the first time in June, 1908. The general effects of low temperatures and their use in connection with food, horticulture, mines, metallurgy, commerce, and transport are to be discussed. Full particulars may be obtained from the secretary to the congress, 10 rue Poisson, Paris.

DR. J. COSSAR EWART, F.R.S., commenced a course of twelve Swiney lectures on geology in connection with the British Museum (Natural History) on Friday last, December 6. The subject of the lectures, which are being delivered on Mondays, Fridays, and Saturdays, at 5 p.m., in the lecture theatre of the Victoria and Albert Museum, South Kensington, is "Horses of the Past and Present." The lecture to-morrow (Friday) will be on the fossil horses of Central Europe compared with Prejvalsky's horse. Admission to the course is free.

THE Duke of Argyll, honorary president of the Franco-British Exhibition, the Earl of Derby, president, the vice-presidents, and the executive and finance committees are this afternoon giving a reception in the exhibition grounds, to be followed by an inspection of the progress of the works.

THE annual conversazione of the Royal College of Science and Royal School of Mines will be held in the new buildings of the college on Wednesday next, December 18. Many interesting exhibits will be shown in the various departments, and Mr. G. S. Newth will deliver a popular lecture on "Coal-mine Explosions."

THE annual meeting of the British Science Guild will be held at the Mansion House on Wednesday, January 15, at 4.15 p.m. The Lord Mayor has consented to preside and to become one of the vice-presidents of the Guild. Mr. Haldane, the president of the Guild, and other gentlemen will address the meeting. Steps are being taken by the Guild to bring the proposals for legislation for the prevention of the pollution of rivers before many societies and local bodies.

WE are requested to make it known that a meeting will be held under the auspices of the Essex Field Club on Saturday, December 14, at the Essex Museum, Stratford, for the discussion of rivers' pollution from the naturalist's point of view. The subject will be opened by Prof. Meldola, F.R.S., and spoken to by Sir William Ramsay, K.C.B., F.R.S., Mr. E. B. Barnard, M.P., Sir Alexander Pedler, F.R.S., Mr. William Whitaker, F.R.S., Dr. Thresh, and other gentlemen well acquainted with the question of water supply. All interested in the matter are invited to attend. Mr. W. Cole, Buckhurst Hill, Essex, will be glad to send cards.

A PROPOSAL made to the Public Control Committee of the London County Council by Signor D. Maggiora to apply the process of discharging cannon of special construction, known in Austria as weather shooting, "to prevent the formation of fog or to disperse it in case it is already formed, and also to disperse and destroy all clouds, and to prevent rain, hailstorms, lightning, and thunder," has been under the consideration of the Council. It was referred to the director of the Meteorological Office for report. The proposal is even more ambitious in its scope than its predecessors of more or less similar character

in other countries of the old or new world. As might be expected, Dr. Shaw's report, based largely upon Prof. Pernter's article in the *Meteorologische Zeitschrift* of March last, and on official reports of the Vienna Meteorological Office, is entirely unfavourable, and the County Council has therefore not been asked to vote money for the proposed experiments.

THE Brent Valley Bird Sanctuary consists of a wood, nineteen acres in extent, which comes into the London postal district. About eighty species of birds have been seen in or near the enclosure, while nearly half that number are known to have bred within it; and for four years a number of members of the Selborne Society and other lovers of natural history have with their own hands maintained the fences and brought them into a state of greater efficiency, or have contributed towards the wages of temporary watchers. Much more should be done, and the committee has therefore made an appeal for annual subscriptions from people who are interested in birds, so that a permanent custodian may be appointed. Subscriptions should be sent to Mrs. Webb, Odstock, Hanwell, W., honorary secretary of the committee and of the Brent Valley branch of the Selborne Society.

At a meeting of the epidemiological section of the Royal Society of Medicine on December 2, papers were contributed by Dr. Haffkine, on the present methods of combating plague, and Dr. Ashburton Thompson, of Sydney, N.S.W., on protection of India from invasion by plague. Dr. Haffkine considers that the following propositions are now more or less generally recognised, viz. that (1) plague is what has been termed, in a general sense, a disease of locality; (2) it is contracted principally at night; and (3) the part which man plays as direct agent in its propagation is a more or less subordinate one. After discussing such measures as desertion of the locality, disinfection, and rat destruction, the conclusion was arrived at that the ultimate method of combating the bubonic plague in the areas in which it becomes endemic is that of conferring on the population immunity from the disease by means of an artificial treatment. Dr. Ashburton Thompson, in his paper, said the fundamental data acquired in the investigations at Sydney are that (1) the epidemic spread of plague occurs independently of communication of the infection from the sick, consequently the infection of plague spreads by means which are external to man; (2) the plague-rat is harmless to man, but is, nevertheless, the essential cause of epidemics; and (3) the intermediate agent between rat and man (and between rat and rat) is the flea. The infection of man is most usually contingent on his being within buildings together with plague-rats.

WE learn from the *Lancet* that Prof. Alfonso Sella, professor of experimental physics in the Royal University of Rome, died on November 25 at forty years of age. From an interesting obituary notice by the Italian correspondent of our contemporary, we extract the following particulars of Prof. Sella's scientific career. Prof. Sella inherited from his father, Quintino Sella, one of Italy's greatest statesmen, a love of science, abstract and applied, which carried him with special distinction through the mathematical and physical curriculum of the University of Turin. Like his sire he took his annual holiday in the Alps, where, in his seventeenth year, he was the first to scale the summit of the Dent-du-Midi; and he found another pastime in aeronautic adventure, a field in which he had many followers, in conjunction with whom he founded the "Società Aeronautica Italiana." For the ten years

between 1889 and 1899 he acted as assistant to the Senator Pietro Blaserna in the Roman "Istituto Fisico," after which he was made professor extraordinary of experimental physics in the University. From that post, after a year's success in the class-room and the laboratory, he was promoted ordinary professor of the same subject, giving also post-graduate instruction (the so-called "Corso di Perfezionamento") to those students who were to make pure and applied physics the business of their lives. His scientific papers, read and discussed before various scientific congresses and societies, were numerous and important, always rich in independent speculation and research. Among these may be mentioned his study on "L'Influenza dei Raggi Röntgen e della Luce Ultra-Violetta sulle Scintille" and his "Ricerche sulla Radio-attività dell'Aria." To him, in concert with Guglielmo Romiti, professor of anatomy and embryology in the University of Pisa, Italy owes her "Association for the Advancement of Science," organised on British lines and convened for the first time in September last at Parma, where it achieved a gratifying success. A committee, composed of Profs. Blaserna, Cerruti, Reina, Volterra, and Tonelli, the Rector of the University, is taking steps to place a memorial of Prof. Sella in the Istituto Fisico in the form of a bust in marble. Subscriptions should be sent to Prof. Reina at the school of applied engineering of the University.

THE second annual general meeting of the National League for Physical Education and Improvement was held on December 6 under the presidency of the Bishop of Ripon. The report of the executive council stated, in regard to the medical inspection of school children, that it will be possible, now a medical department has been established, to advise the Board of Education that under efficient supervision and control the best uniform system may prevail and be carried out under conditions sufficiently elastic to suit the requirements of different districts. The knowledge and experience gained in other countries are sure to have important results in their bearing upon the work of the league. On the question of pure milk, a joint committee of the league and the National Health Society, on which were members of the Infants' Health Society and other similar organisations, the Royal Commission on Tuberculosis, and the Royal Veterinary College, has now been formed, and has drawn up a preliminary report, in which it is recommended that the periodical veterinary inspection of all cows, the milk of which is being offered for sale for human consumption, should be made compulsory throughout the United Kingdom. The Milk Committee is now preparing recommendations with regard to milking and handling, transport and distribution.

AN account of an expedition in the Himalayas, which included the first ascent of Trisul (23,406 feet), has been given to Reuter's representative by Dr. T. H. Longstaff. The party consisted of Major C. G. Bruce, Mr. A. L. Mumm (late hon. secretary to the Alpine Club), Dr. Longstaff, and guides. Originally the object of the journey was to attempt the ascent of Mount Everest from the Tibetan side, but for political reasons this was found to be impossible. It was decided to go to the central Himalayas, to Garhwal, and from that point attempt Trisul. After two marches along the Trisul glacier the party started up the snow slopes of the mountain on June 7, and that evening reached a height of 20,000 feet. During this period Dr. Longstaff had by far the worst experience in his foreign travels. On the third day the party descended to the foot of the mountain, and again camped at 11,600 feet. On June 11 Dr. Longstaff and his guides marched rapidly round his old track, camping the same afternoon

at a height of 17,450 feet. On the following morning the party started at 5.30 a.m., and five hours later reached its highest camp of 20,000 feet. As dangerous crevasses half covered with snow and ice were ahead, the explorers roped themselves together, and at noon reached 21,000 feet. The party now followed the narrow N.N.E. ridge of Trisul, which leads straight to the summit. At 4 p.m., after ten hours' continuous climbing, the summit was reached. The cold was so bitter that it was only possible to remain for fifteen minutes. To the west the view was one of extraordinary vastness, as the horizon extended over the whole of the lower Garhwal and the snow peaks beyond. To the north lay the Tibetan frontier, obscured by rolling masses of black cloud. To the east were the frowning cliffs of Nanda Devi and its untrodden glaciers. The party now turned its attention in the direction of the Tibetan frontier, and during July explored glaciers to the east and west of Kamet (25,450 feet), reaching on one occasion an altitude of 20,000 feet on the mountain. In August and September Dr. Longstaff explored the valleys to the south and west of Trisul, while Major Bruce and Mr. Mumm made more ascents in Kashmir.

THE report of the council of the Royal Agricultural Society, presented at the annual general meeting held on Wednesday, December 11, states that the frosty weather in the spring caused injury to white clover, broad beans, and wheat, and the wet summer and autumn led to extensive injuries by parasitic fungi. Many investigations have been made into these diseases. Another unobserved enemy to the potato, *Stylanus capitatus*, has been proved by experiment to attack the living plant. A hawthorn hedge was seriously affected by *Botrytis cinerea*. Bacterial injuries to potatoes, broad beans, and oats have been investigated. Scouring in stock was found to be due to the mould developed on the feeding cake. In the zoological department nothing of special importance was reported, except the recurrence of the pygmy mangold beetle, which is probably a more frequent and serious pest to mangold than has hitherto been supposed. With the abnormally wet summer came a large number of complaints of caterpillar attack, and in many instances the caterpillars were of species not usually seriously troublesome. Later again, certain pests generally associated with particularly dry seasons began to be complained of, as the results of the continued fine weeks of the late summer and autumn. The council, at its last meeting, considered a suggestion that the Board of Agriculture should be urged to schedule tuberculosis, and, after discussion, the following recommendation of the veterinary committee was unanimously adopted:—"That in the event of the promotion of legislation dealing with the question of tuberculosis and other diseases of cattle, the council of the Royal Agricultural Society of England is of opinion that any regulations for dealing with this question should be issued by the Board of Agriculture and not to any other department." A discussion ensued as to the desirability of forming a national representative body to safeguard, so far as possible, the interests of agriculturists in connection with any measures to be adopted for dealing with the question of tuberculosis in cattle, and it was resolved:—"That a committee be formed to communicate with other societies for the purpose of watching the interests of agriculture, in view of possible legislation with regard to the tuberculosis question." The society's show will be held at Newcastle-upon-Tyne in 1908, and at Gloucester in 1909.

THE Hon. Walter Rothschild has recently received half-a-dozen specimens of the Californian elephant-seal (*Macrorhinus leoninus angustirostris*), a race which had for some

time been regarded as extinct. The specimens were obtained from Guadalupe Island, off the coast of Lower California, and before they were shot the collector was fortunate enough to obtain several photographs of them as they lay on the beach, which consists of huge boulders of volcanic rock, some black and some white, with intervening stretches of sand. Enlargements of these photographs have been presented by Mr. Rothschild to the British Museum (Natural History). The Californian elephant-seal is somewhat smaller than the typical elephant-seal of Heard Island, the Crozets, and other islands in the southern ocean, but can scarcely be regarded as more than a local race. With the exception of a specimen destroyed in the late San Francisco fire, adult male examples of this animal have hitherto been unrepresented in museums. Two of Mr. Rothschild's specimens are being mounted for the museum at Tring by Rowland Ward, Ltd.

AMONG the papers in vol. lxxxviii., part ii., of *Zeitschrift für wissenschaftliche Zoologie* is one by Dr. M. Nowikoff, of Heidelberg, on the dorsal sense-organs of chitons, with remarks on the structure of the shell in those molluscs. Certain tropical chitons, it will be remembered, possess eyes on the dorsal surface of the shell, but all, it appears, have a canal-system within the shell itself which is likewise sensory in function. Both the eyes and the canal-system are described in detail by the author, who also directs attention to the peculiarities presented by the fibrous layer connecting the eyes with the epidermis. The dorsal eyes are of two types, one characteristic of the subfamilies Tonicinæ and Liolophurinae, and the other restricted to certain species of chiton itself. It is remarkable that in certain species, especially *Tonicia chilensis*, the dorsal eyes are attacked, and apparently destroyed, by an alga, which develops within the substance of the shell.

THE Health Committee of Liverpool has issued a report (published by C. Tinling and Co., Ltd.) on investigations undertaken by Mr. R. Newstead, of the School of Tropical Medicine, Liverpool University, on the habits, life-history, and breeding-places of the house-fly, as observed in the city. The chief breeding-places were found to be in pits for the store of stable manure, fermenting heaps of hop refuse, and ash-pits containing fermenting vegetable matter, the infection being equally as great in closed as in open receptacles. Although the ordinary disinfectants appear to be of no avail in checking the development, barndoor fowls are of great value in reducing the numbers of grubs and pupæ. The period of development (which in ordinary circumstances may last from three to five weeks) is reduced by the heat of fermentation to a minimum of ten days, and this accounts for the fact that in ash-pits emptied weekly in summer no flies are produced. The emptying of these and other receptacles for refuse at intervals of seven days in summer is therefore recommended; while, in connection with other remedial measures, attention is directed to the importance of early removal of fermentable matter from streets and other public places.

THE Board of Agriculture and Fisheries has issued an order, the short title of which is the "American Gooseberry Mildew (Prohibition of Importation of Bushes) Order of 1907," under which the landing in Great Britain of any gooseberry bush or currant bush brought from any place out of Great Britain is strictly prohibited. The order also provides that if, on any examination, an inspector finds any bush which is affected with American gooseberry mildew, he is forthwith to communicate the fact to the Board, and serve on the occupier of the premises on which

the bush is found a notice prohibiting, until the notice is withdrawn by a like notice, the removal of any gooseberry or currant bush from those premises.

AMONG the papers in the September issue of the Proceedings of the Philadelphia Academy, reference may be made to one by Dr. H. A. Pilsbry on the barnacles of the genus *Megalasma*—a genus established on the evidence of a specimen dredged during the cruise of H.M.S. *Challenger* in the Philippine archipelago. In the author's opinion the genus should, however, be taken to include one sectional group of the numerous species hitherto included in the nearly allied *Pœclasma*.

EXTERNAL parasites infesting domesticated animals in India form the subject of a special investigation by the entomological division of the Department of Agriculture. The first results of the investigation, dealing with ticks, are published in Bulletin No. 6 of the department in question. According to the author, Mr. C. Warburton, over the greater part of India the ticks infesting domesticated animals belong for the most part to four species only. Two other species may, however, occur sporadically in some numbers, but the occurrence of any other type is so rare as to be of no economic importance. Means of identifying the six species are given in the paper.

THE current number of the *Annals of Tropical Medicine and Parasitology* contains articles on a variety of matters bearing directly or indirectly on the subjects named in the title. An important memoir by Mr. J. E. Salvin-Moore and Dr. A. Breinl breaks new ground, and will excite much interest, perhaps also some controversy, amongst the many investigators of this important class of parasites. Valuable contributions upon African parasitic protozoa, and upon *Spirochaeta duttoni*, the parasite of African tick fever, are furnished by the late Dr. J. L. Dutton, Dr. J. L. Todd, Dr. E. N. Tobey, and by Dr. A. Breinl respectively. It looks at first curious to see included in this journal two almost purely zoological memoirs on Cyclopidae from the Gold Coast, by Dr. W. M. Graham and Dr. G. S. Brady, but Cyclops comes into indirect relation to tropical medicine by acting as a host for the guinea-worm. Dr. C. W. Branch writes on yaws. The contents of the journal bear testimony to the broad scientific spirit in which the Liverpool School of Tropical Medicine carries on its work.

PROF. E. DE JANCZEWSKI has rendered a service to the botanical community by the publication in vol. xxxv., part iii., of the *Mémoires de la Société de Physique et d'Histoire naturelle de Genève* of a valuable monograph on the genus *Ribes*, embellished by some excellent illustrations. It is particularly interesting to find that the author has examined numerous living specimens, and has cultivated many of the species. Six subgenera are demarcated, of which two are characterised by the production of dioecious flowers. In the subgenus *Parilla* the flowers bear sterile organs, but in the species of the subgenus *Berisia* the staminate flowers have no distinct ovary, nor do the pistillate flowers produce pollen. The chief centres of the genus are found in North America and in China, except for the species of the subgenus *Parilla*, that are almost confined to South America. Eighteen hybrids are described, most of them representing crosses between species in the same subgenus.

FOUR parts, numbered 16 to 19, of the "Materials for a Flora of the Malayan Peninsula," have been published as an extra number of vol. lxxiv. of the Journal of the Asiatic Society of Bengal. Three numbers appeared in

1905; the fourth has recently been issued. Apart from the account of the genus *Psychotria*, that concludes the *Rubiaceæ*, these numbers contain the orders—following the sequence of Bentham and Hooker's system—*Valerianæ* to *Loganiaceæ*. The authors, Sir George King and Mr. J. S. Gamble, have assumed responsibility for separate orders in addition to certain others undertaken by Colonel D. Prain. For the twenty-eight orders colated, the species amount to 686, of which 190 are new to science. The additions are numerous in the *Myrsinaceæ* and *Sapotaceæ*, notably in the genera *Ardisia* and *Bassia*, also in the genus *Diospyros*. A new genus, *Pernettyopsis*, and five species of *Rhododendron*, form an increment to the *Ericaceæ*. Many of the genera of the *Apocynaceæ* are very fully represented in Malaya, e.g. *Urceola*, *Anodendron*, and *Willughbeia*. The *Sapotaceæ* and *Apocynaceæ* are rich in rubber, gutta, and other economic species.

THREE memoirs have recently been issued by Dr. Leather, of the Agricultural Research Institute, Pusa (India). One, on the composition of Indian oil seeds, gives the percentage of oil in eleven different varieties, including cotton-seed, linseed, and others less known here. Among other interesting points, it is stated that Indian linseed contains about 40 per cent. of oil, and is consequently richer than seed grown elsewhere. Further investigations of oil seeds are much needed on account of the commercial value of the oil and the agricultural value of the residue left after extraction. In another memoir a description is given of the pot culture house at Pusa; the only novel point is the method of watering. The soils under investigation cracked and caked if water was poured direct on to the top; it was therefore allowed to diffuse out from a porous pot placed in the soil. This method is commonly employed to irrigate trees in parts of India, a porous spherical vessel being sunk in the ground near the root of the tree and kept full of water. The last memoir deals with experiments on the availability of phosphates and potash. The general result is that Dyer's citric acid method for determining phosphates is likely to be useful in examining Indian soils. This, indeed, might reasonably have been expected.

In the *Journal of the Franklin Institute* (vol. clxiv., No. 3) Dr. E. Goldsmith describes a meteoric stone which was seen to fall on April 30, 1906, on the New Jersey shore. On analysis the stone yielded 44.36 per cent. of iron, 42.80 per cent. of silica, 4.18 per cent. of alumina, 2.00 per cent. of nickel oxide, 1.90 per cent. of titanitic acid, and 1.84 per cent. of carbon.

WE have received from the author, Mr. J. P. Johnson, a pamphlet (Johannesburg, price 1s.) containing two short papers on the auriferous conglomerate of the Witwatersrand and on the antimony deposits of the Murchison range. The former, while containing little that is new, gives a concise review of the geology of the goldfield, and the latter contains a description of some interesting antimony ore deposits which appear to be impregnations of a bed of metamorphosed limestone. The antimony occurs as sulphide, altered at the surface into a yellow oxide and the hydroxide.

In the *Journal of the Franklin Institute* (vol. clxiv., No. 5) Mr. L. E. Levy gives an appreciative obituary notice of Prof. Angelo Heilprin, the eminent American geographer and geologist, who died on July 17. In 1876 he studied in London at the Royal School of Mines, where he gained the Edward Forbes medal. He was the author

of numerous important works, the most interesting being "The Arctic Problem" (1893), which contains the story of the Peary Relief Expedition, which he organised. He lived but fifty-four years, yet within that brief period he accomplished work that would well suffice the compass of the longest lifetime.

AN important report, compiled by Miss A. M. Anderson and Dr. T. M. Legge, has been issued on dangerous and injurious processes in the coating of metal with lead, or a mixture of lead and tin. The Blue-book also contains the results of an experimental investigation into the conditions of operating tinning workshops, which has been written by Mr. G. E. Duckering, one of His Majesty's inspectors of factories, who carried out the investigation. The most important of the suggested regulations set forth in the report is that no lead shall be used in the tinning of metal hollow-ware.

THE president of the International Aëronautical Committee has sent us a summary of the places that took part in the scientific balloon ascents of July 22-27, and the heights reached, so far as at present known. This series of ascents was made in compliance with a suggestion by the recent Aëronautical Conference at Milan that a special effort should be made to obtain information regarding the conditions obtaining in the upper regions of the atmosphere on consecutive days; the results will be eventually published in detail by the Aëronautical Committee. About fifty places took part in the investigation, the extra-European ascents being at or near the Azores, Spitzbergen, Iceland, China Sea, Cairo, and the United States; at Simla unfavourable weather prevented experiments from being made. Twenty-five balloons were sent up in England and Scotland alone, and (so far as yet known) some of the balloons from Manchester reached the highest altitude attained in any of the ascents, viz. 21,500 metres. From Uccle (Brussels) a height of 21,140 metres was reached, and 20,000 metres near the Azores. We learn that nearly all the English balloons drifted to the eastward, and that the temperature records proved conclusively the existence of isothermal conditions above some 12,000 metres, thus confirming the interesting theory put forward by M. Teisserenc de Bort. We understand that similar special ascents extending over a week will probably be made next year, and that, through the efforts of Prof. Schuster, arrangements have been made by the University of Manchester for the kite station on Glossop Moor to be continued.

A CLEAR and concise statement of our present knowledge of the masses of the electrons which play so important a part in electrical phenomena was presented to the Italian Physical Society in the form of a report on the subject by Prof. Levi-Civita at the recent congress at Parma, and is published in full in the October number of *Nuovo Cimento*.

AFTER careful consideration of the various methods of determining the ratio of the electromagnetic to the electrostatic unit of electricity, Messrs. E. B. Rosa and N. E. Dorsey came to the conclusion, several years ago, that the most accurate were Maxwell's bridge method, in which a condenser rapidly charged and discharged replaces one of the resistances of a resistance bridge, and the method in which the charges or the discharges of a condenser rapidly charged and discharged are sent through one coil of a differential galvanometer, while a steady current from the charging battery is sent through the other coil. The October number of the *Bulletin of the U.S. Bureau of*

Standards contains an account of a determination they have made by the latter method, according to which the ratio for vacuo is 2.9971×10^{10} , with an uncertainty not exceeding 1 part in 10,000. It is interesting to compare this result with the most probable value of the velocity of light, which, according to M. Weinberg's recent discussion of the measurements available, appears to be *in vacuo* 2.9986×10^{10} , with an uncertainty not exceeding 1 part in 10,000.

A METHOD of preserving eggs by dipping them in recently boiled water at a temperature of about 110° F., then into boiling water, and afterwards into cold water, was described in an article in NATURE of November 28 (p. 84). In reply to an inquiry, the writer of the article states that the time during which the eggs are immersed in the water at 110° F. in this method should be about ten seconds.

THE Silica Syndicate, Ltd., of 82 Hatton Garden, has issued a new price-list of chemical apparatus made from transparent vitreous silica by their special process. The apparatus includes evaporating basins, beakers, crucibles, flasks, retorts, and test-tubes; the prices are about 75 per cent. lower than those ruling a year ago, and it is anticipated that as the demand grows for fused silica ware further reductions will become possible. We have had an opportunity of examining the various pieces of apparatus made by the syndicate, and have been struck by their wonderfully clear and homogeneous character as compared with that of silica ware made by other processes. They are, moreover, comparatively thin and light, a fact which makes them useful for many purposes for which coarser vessels would be unsuitable; crucibles of fused silica, for instance, can often be used in place of platinum crucibles. In spite of their thinness, the quartz vessels are very strong and tough, and much less liable to break than either ordinary or Jena glass; even if broken they do not splinter, but merely crack, so that they can easily be repaired by fusing the broken parts together. Such repairs are executed by the syndicate at a trifling cost. To those unacquainted with the properties of fused silica, the following points may be of interest. It does not crack when subjected to the most violent and sudden changes of temperature. It is not attacked by acids, with the exception of hydrofluoric acid, and is harder than ordinary glass. Its melting point is approximately that of platinum, whilst it has a coefficient of expansion of 0.0000059 per degree, that is, about one-seventeenth the value for platinum. So far as is at present known, it shows no tendency to devitrification.

A NEW catalogue of lantern-slides has been received from Mr. C. Baker, 244 High Holborn, W.C. The list contains slides suitable for the illustration of lessons or lectures on natural history, and includes many from photomicrographic negatives, as well as photographs taken from nature with an ordinary camera. Sets of slides have also been arranged to illustrate some leading books on microscopic objects.

MESSRS. J. H. DALLMEYER, LTD., inform us that they have recently appointed several new wholesale agents for their lenses and apparatus abroad. They state that British lens manufacturers, like British dry-plate manufacturers, are able to hold their own in foreign markets in face of high tariffs walls and severe competition. In the United States the duty alone amounts to 45 per cent. of the value of the goods, whilst Germany is the home of the keenest competitors of manufacturing opticians.

WE have received from Messrs. Siemens Brothers and Co., Ltd., two well-produced and conveniently arranged

catalogues. One deals with thermoelectric pyrometers and temperature indicators and recorders which can be used for all processes in which the accurate determination of temperature between the limits of about -190° C. and 1600° C. is a necessary factor. The other supplies a descriptive account, with abundant illustrations, of a great variety of electro-medical apparatus. Among these attention may be directed to the patent tantalum X-ray tubes, which can be worked with the anti-kathode at red heat, and the induction coils with variable primary windings. Medical men and others should find the clear diagrams of assistance in understanding the characteristics of the apparatus described.

MESSRS. NEWTON AND CO. have sent us a copy of a descriptive lecture on the moon, illustrated by sixty lantern slides, arranged and prepared by Mr. R. Kerr. The notes upon the characteristic points of the various slides, all of which are from Messrs. Newton's collection, will enable anyone to give an interesting reading on our satellite without possessing special knowledge of astronomy. Another pamphlet containing notes on lantern-slides, intended for purposes of popular lectures, deals with general astronomy. This pamphlet is now in its fifth edition, and has been revised and enlarged. It comprises much information of an old-fashioned type, and can scarcely be considered as representing the work and results of modern astronomy; nevertheless, many instructive notes may be extracted from it. A more careful revision of the pamphlet would have prevented such errors as:—"Of the nature of this ring [of Saturn] . . . we are not acquainted"; 1006 instead of 1066 as the date of an appearance of Halley's comet; "Mr." Huggins for Sir William Huggins; and HB instead of H β .

OUR ASTRONOMICAL COLUMN.

PHOTOGRAPHS OF JUPITER'S SATELLITES VI. AND VII.—During the opposition of 1905-6 eighty-six photographs of Jupiter's sixth satellite were secured at the Greenwich Observatory, with the 30-inch reflector, between August 23, 1905, and February 15, 1906. Nineteen photographs of the seventh satellite were taken between October 22, 1905, and January 26, 1906. The opposition of 1906-7 was somewhat marred by bad weather, but on twenty-eight nights, spread over a period of 222 days, fifty-six photographs of the sixth satellite were obtained. Only on seven nights, during a period of eighty-seven days, were photographs of the seventh satellite secured, amounting to twelve in all. From these photographs the positions of the satellites were determined, and the results are shown graphically on two diagrams published in the Monthly Notices for November (vol. lxxvii., No. 9, p. 561). The orbits of the four major satellites are shown for comparison, and the difference in the size of the orbits of the four inner and two outer satellites is very striking.

TEMPERATURE CONTROL OF SILVERED MIRRORS.—No. 122 of the Lick Observatory Bulletins contains a short paper by Dr. Heber D. Curtis on the temperature control of silvered specula. The writer discusses first the previous records of changes in the focal lengths of large specula, briefly referring to the experience of Profs. Keeler, Perrine, Hale, and Wright in this matter. He then describes a method of artificial cooling which he has tried, and found to be effective, with the 37-inch Mills reflector, which is being used by the D. O. Mills expedition to the southern hemisphere, of which he now has charge.

The large mirror has a clear aperture of 36.56 inches and a focal length of 17.46 feet, and, during his work with this instrument, Prof. Wright found that a progressive lengthening of the focal length, amounting to from fifteen to twenty-five millimetres, took place during the first four or five hours of each night's work, the drop in temperature being some 5° C. or 6° C. In the first place, Dr.